32X Sound Simulator
Ver. 1.00

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Overview and Glossary

The 32X Sound Simulator is a tool that transfers the sound data created using the Tone Editor 32X to the CartDev and that performs an emulation. Therefore, before the Sound Simulator is started, the data creation using the Tone Editor 32X must be complete. The following description of the 32X Sound Simulator, with reference to the sound creation task (also "Proj"), assumes that the necessary data creation tasks have been completed.

The development of any sound package presumes that the package will be incorporated into a game cartridge. Therefore, ultimately all sound data must be integrated. The goal is to create a single sound object. The integrated, final output file is referred to as a 'bulk file'. The sound development process is complete when the bulk file is incorporated into a game.

The following illustrates the basic screen, called the Edit window, for the Sound Simulator. The data files created using the Tone Editor 32X are mapped onto the Edit window. How to perform mapping will be explained later.

The Sound Simulator keeps track of the modules located in memory in terms of the numbers that appear in the leftmost column in the Edit window. Modules are displayed on the Edit window on a line-by-line basis. Each line is called a block.

Icon for a bulk file

Activation Method

When using the SDK Sound Simulator for the first time, click on the 32sdsdStm option in order to effect the condition in which the New option is automatically selected from the file menu (see the "New" option on *1. File"). If a task has been completed previously and the Edit window has been saved, a project file is already available. In this case, the task can be resumed by clicking on the project file.

Mapping

"Mapping' refers to the task by which sound files containing various elements are allocated to memory. Game producers must keep track of the sequence in which files are allocated, and the order in which SDK data management routines are performed by the Sound Simulator.

The following describes how to perform actual mapping using sample data in order to create a huik file.

The five indicated below, all of which are created using the Tone Editor. JIN, are contained in the supplied sample data. The five or the MIDI setting is not required for the Sound Simulator.
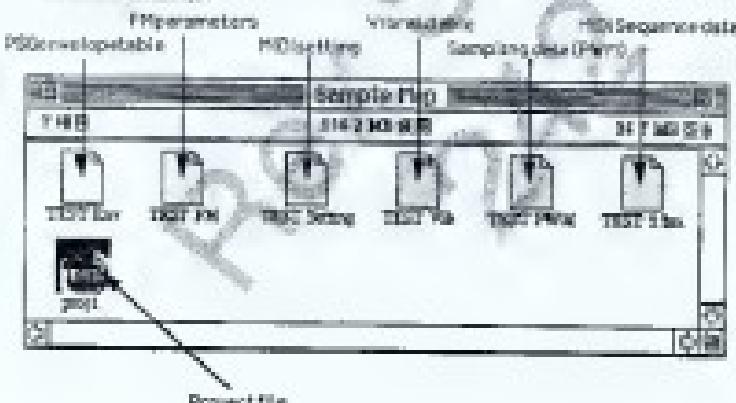
First, we list the following files in the indicated order: Sequence data, Fm parameters, Vibrato table, PSG envelope, and Sampling data (PWM). The Edit

window contains the image of a memory mapping on a cartridge. That image contains the addresses beginning with address 0 of the ROM cartridge, and items that are necessary for running SX software, including vector information and a boot-up program. Therefore, the Sound Simulator also requires the items necessary for running the SDL as separate from sound data. The Edit window displays these required items. In the table shown below, the item 'ROM1topHeadr' corresponds to the required items.

The item 'Snd DRVRS' represent the Sound Driver. By default, the Sound Driver is allocated at address 0x20000. An address must be set whenever a new project is commenced. (See the 'New' option in '1. File'.)

The item 'DRVR Pro0' holds the relation information necessary for linking blocks. This is a reserved area that stores information on the blocks that have been linked.

| 01 | 000000-0001FF | 000200 | ROM1topHdr | |
| 02 | | | | |

The above three modules are required modules; they exist independently of the project file. Consequently, actual mapping is performed beginning with the fourth block from the top. Therefore, select the 'New' option from the menu bar. The fourth block appears

01	000000-0001FF	000200	ROM1topHdr	
02	001000-001FFF	002000	Snd DRVRS	
03	020000-0207FF	000800	DRVR Pro0	
04	01FF0-0107FF	000800	SEQ Prj0	

Double-clicking on the fourth block brings up the following dialog box.

Because the sequence data is the first item to be linked, drag the cell indicated by 'Data type', and select the 'Sequence' option from the popup menu.

Data type pop menu

Select "Sequence"

Then, click on the "Load file" item in order to bring up the following dialog box. Select the sequence data file 'test9.bin' from the dialog box.

The file 'test9.bin' is now mapped to the fourth cell.

The current block is displayed in reverse video, indicating that the block is available for editing. Since the purpose now is to map the next FM bottom data, click on the block in order to cancel the reverse video display.

Repeat the above procedure to effect the following mapping:

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Edit window - Untitled

CENT	No	Start	End	Scale	loop	loop tel	File name
01	00	000000-027127	027199	0FFFF	0E0C0	00	
02	01	01E1A0-023C40	0025A0	1000 00000	00		
03	02	01B28C-01D40D	0029A0	0F90 21C0	00		
04	03	01E570-025077	000099	Seq record	00	0	TEST 9.bin
05	04	015B7B-016D77	199039	17A5 6F0	00	0	TEST F.bin
06	05	017E78-018D77	000000	PS(Tele0)	01	0	TEST 6.bin
07	06	015078-016D77	199099	Vb Telbl0	00	0	TEST E.bin
08	07	018D78-027D77	190099	PS6 (no)	00	0	TEST P.bin
09	08	017D78-145379	027199	PS6 (Tele0)	00	0	TEST V.bin

This completes the mapping. The results of the mapping are stored in the 'proj' file. See the 'Save' option in "1. File" for a description of how to save files.

In the next step, verify that the data in the project file is correctly played back.

First, execute the 'Load all filter' option in "1. File". A Write memory box occurs to assure display on the TV monitor informs that the execution is successful, and that stored data has been loaded onto the CartDev's emulation memory.

Next, execute the 'Start sound' filter option in "3. System". This sets up the Sound Driver. Now, wait for a moment.

The request method to the command is the 'Music test' option in "3. System". Execute the request method first.

The music must have been performed flawlessly. At this point, the program creates a bulk file and is complete. Bulk files are created using the 'Link all filter' option in "1. File".

Detailed Description of Functions

The menu bar for the Sound Simulator contains six menus. In the following, the menus are explained in the order in which they appear in the menu bar.

 File Edit Systems Map Display Function

1. File

```
┌─────────────────────────┐
│ File                    │
├─────────────────────────┤
│ New            ⌘N       │
│ Open           ⌘O       │
│                         │
│ Close          ⌘W       │
│                         │
│ Save           ⌘S       │
│ Revert file             │
│                         │
│ Load                    │
│ Load all files          │
│ Load auto files only    │
└─────────────────────────┘
```

The file menu provides a user-friendly interface for the use of the file-oriented functions currently supported by the Sound Simulator.

New

This option creates a new map. If a map is being produced, the program asks the user whether or not the current data is to be saved before a new map is opened.

```
┌────────────────────────────────────┐
│  Has file has important             │
│  time before saving?                │
│                                     │
│        ┌──────┐                     │
│        │ Save │                     │
│        └──────┘                     │
│     ┌──────┐   ┌────────┐           │
│     │ Open │   │ Cancel │           │
│     └──────┘   └────────┘           │
└────────────────────────────────────┘
```

When a new map is to be created, the dialog box indicated below appears, and the program asks whether a SDK simulation map or a Sound editor map is to be created. When so prompted, set the following three parameters: sound-driver address, amount of song, and amount of S.E.

When using a wav file the first
time, the menu, titled below, apply
the indicated parameters.
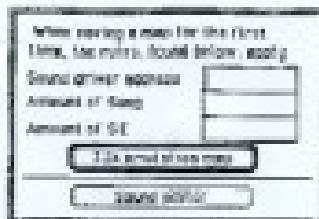
To create a new map, set
the following parameters.

[boxed diagram]
When saving a wav file the first
time, the menu, titled below, apply

Menu of wav

Title of wav

Amount of G2

[1st rectangle in wav menu]

Sound Driver address

When creating a map, specify the location in which the Sound Driver is to be stored in the final sound data file, to be incorporated into a game, its starting address coincides with the starting address of the Sound Driver. Therefore it is critically important to determine the correct storage location for the Sound Driver.

Because it is unsuitable, the Sound Driver can be allocated to any address. However, it should not overlap with the 68000 system, which is composed of programs that process vectors and the commands that are issued by the Microtosh. The area from 0x00000 through 0x002FFF is reserved for the system. Therefore, do not allocate the Sound Driver to any address that overlaps with this area.

Amount of Song Amount of SE

In these parameters, enter the total number of BGMs and sound effects. If the total is not known, enter an appropriate maximum value, which can be modified later on.

After completing the above setup, click on the 32X resolution map. Use the Sound Editor when loading an old development tool. Since old development tools are not supplied by SEGA, specify it is not necessary for the user to select the Sound Editor menu.

Open

This option is used to open an existing project file. After opening a project file, this menu transmits the file (ROM/log/sys) whose block-0 auto-transmission system has been checked off, and wants the 32X.

Close

The option closes the current project file. If there has been a change in the map, the program asks whether or not the project file is to be saved before it is closed. The menu does not transmit the tool.

Save

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This option saves the current project file. If no existing file has been modified, the save menu option automatically overwrites the existing file. If a new map is to be saved the save menu option prompts for a new destination. If a manumap file has been changed or moved and the associated alias information has been updated, the save destination dialog box appears even when no changes have been made to the file.

Revert file

This option allows the user to save a project file under a different name.

Load

This option transmits the file containing a specified block to the map being edited, and resets the SIX

Load all files

This option transmits the project file (the entire list to the map being edited), and resets the SIX. If a file does not exist, the option still attempts to transmit it. See the manual for reference (Version 1V/27).

Load auto files only

This option only transmits files whose auto transmission option is checked off (`auto load files`), and resets the SIX

An auto load file refers to the file that is always loaded when loading a specified for a block with which the file is associated. Auto load files are user-specified.

To specify an auto load file, click on the Auto Load option on the dialog box that appears when the desired block is double-clicked. Clicking on the Auto Load option causes the system to recognize the auto load file
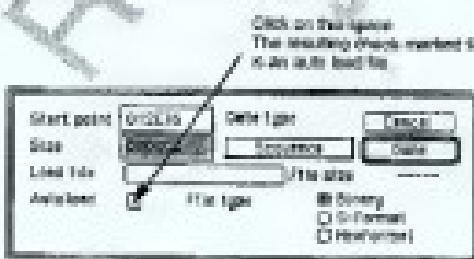
After transmitting a file, the Sound Driver always creates the position that it was. Only the "Load all files" option can reenact the Sound Driver.

Caution!

When using the "Load files" or "Load auto files" option, make sure that the transmission address and the transmission size have not been modified. Even when either the transmission address or the transmission size has been changed, the transmission produces the correct results if, immediately, the blocks of the transmitted file do not overlap with the address of other blocks. Normally, however, such a transmission results in the destruction of memory contents.

Link all files

This option creates a bulk file, and is used at the final stage of a sound development.

Link auto load files

This option only loads the file that specifies an auto-load file and creates a bulk file. The bulk file is saved beginning at the address is. Any unused portions of the blocks in which an auto-transmission setting is not provided are filled with the data zero.

Quit

This option frees any used memory and terminates the Sound Simulator. If there is a proper file being deleted, the user is prompted with the question of whether or not the file is to be saved. When quitting the Sound Simulator, always perform the termination action from this menu item.

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2. Edit

Edit
Edit data
Change map name
Delete   %X
Copy   %C
Paste   %V
Insert   %I
Clear data

New map
Delete map
Copy map
Insert map
Paste map
Clear map data

The edit menu allows the user to perform deletion, addition, pasting, and insertion operations on a project file. To perform an operation on a block, select the desired block in the Edit window. To perform an operation on an entire project file, select the desired project file from the map menu in the menu bar.

Edit data

This option allows the user to rewrite information in the current block. This menu option, which can be used to move the address of the current project file, automatically relinks the project file so that the data blocks will not overlap any of the previously set sizes and starting addresses. Notice, however, that if the results of relinking are not at resonant addresses, the program does not make an error. On the other hand, in some cases the absence of error conditions can be beneficial.

This menu can also be invoked by double-clicking on the Edit window.

The blocks indicated below are controlled by the system, and are not available for editing by users. If the area of another block that is being modified overlaps with any of these blocks, the system does not move the starting addresses of the affected blocks. These three special blocks are called 'system blocks'.

New

This option adds a new block to the right sequence of a selected block (reverse-displayed block); the block is inserted immediately above that block.

Change map name

This option renames the current block file.

Delete

This option deletes a specified block. The "Delete and reopen" option moves up the trailing blocks after deleting a block, so that there are not gaps in memory.

Copy

This option copies a specified block without copying the block's starting address or size.

Paste

This option overwrites (pastes) onto a specified block the block that was copied through the copy menu. If a destination block is not selected, no action is performed.

Insert

This option inserts the block that was copied by the copy menu into the location immediately above a specified block. If a destination block is not selected, the option inserts the copied block at the end of all blocks.

Clear data

This option clears a selected block. It differs from the "Delete" option in that it saves the data type. The data type of a selected block holds no information such as the specified block in an area for sequence data. In the figure below, the arrows indicate data types.

01	000000-000000	000000	Door type	
02	000000-000000	000000	Obj section	
03	000000-000000	000000	Seq section	
04	000000-000000	000000	Box Seq	
05	000000-000000	000000	FM Setog	

Data type information

Because a data type specification is critically important, the following confirmation message appears. To execute the specification, click on the Done option.

If information cannot be saved,
data will not be recursive. Proceed?

[Done]   [Close]
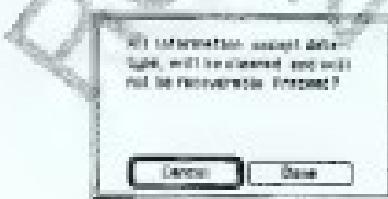
New map

This option opens a new project file. Before executing this menu, be sure to save
the current project file.

Delete map, Copy map, Paste map, Insert map

This option deletes, copies, pastes, or inserts the current map.

Clear map data

This option performs the "Clear data" on all blocks, without displaying a
confirmation message.

3. Systems

```
Systems
  Start Sound Driver

  Resend sound editor
  Resend 32X system state

```

Start Sound Driver

This option starts the Sound Driver and generates a V-interrupt in the 32X. After
booting data, be sure to start the Sound Driver.

Resend sound editor & reboot

When the Sound editor map is given, this option resends and restarts the Sound
editor only. However, because the Sound editor is normally not used, this item
should not be selected.

Resend 32X system program & reboot

This option resends the system block only, and restarts the 32X

4. Map

The Sound Simulator is capable of opening multiple project files simultaneously. However, the Macintosh's monitor displays only the project file that can be edited currently. The Map menu can be used to switch the files to be edited.

5. Display

When several project files are opened, sometimes it may be necessary to monitor the contents of a project file other than the current file. This menu allows the user to create a monitor window that displays the contents of non-current project files.

6. Function

```
┌─────────────────────────────┐
│  Function                    │
├─────────────────────────────┤
│  Music test                  │
│  SE test                     │
│  Create utility              │
│  Create flag test            │
│  Track mute                  │
│  Map selector                │
│                              │
│  Memory configuration        │
│  Change font size            │
└─────────────────────────────┘
```

This menu sets a sound request and the CartDev memory menu

Music test, SE test, Create utility

This menu opens BGM, sound effect, and utility requests. Before making a request, be sure that the Sound Driver is running. From the "System" item on the menu bar, select the "Start sound driver" option. This causes the "Set sound driver" message to be displayed on the TV monitor. If the TV monitor is connected, verify the connection.

The BGM, sound effects, and utility programs all share the same menu interface and provide the following parameters, listed from the left: sound function number, request number, and song title. For a description of available requests, see the section on the Sound Driver.

The meanings of the buttons are as follows:

Start
Issues a request code to the Sound Driver.

Edit
Changes specified data contents.

New
Creates a new data table.

Delete
Deletes unneeded data.

Insert
Inserts a new data table into a specified table.

Cancel
Closes the current dialog box while retaining the current contents. The cancel function can also be invoked from the 'Close' box.

Create flag test
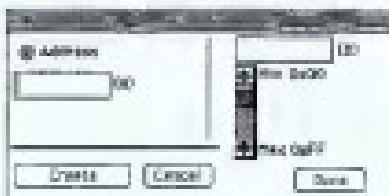
This option sets a request code and sends it to various addresses. The user can also send a request code by directly specifying an address. The Create flag test option differs from the 'Msasc test, SE test, Create utility' option in that it permits the setting of an address.

Track mute

This option is not available in the current version of Sound Simulator. Therefore, the option should not be selected.

Map selector

This option allows the user to control the 68000 from the Sound Simulator.

switch control over to 68000 and run program there

Click on this option by specifying the desired address. When an address is entered, the cpotat moves the 68000 program counter to that address. This function can be used to execute a user-generated program simultaneously with the Sound Driver, provided that the program module is loaded at the target address. See Helpful Hints and Technical Information!

Start Tone Editor

This option is not available in the current version of Sound Simulator. Therefore, this option should not be selected.

Dump 256 bytes of memory

Click on this option by specifying the desired address. The option dumps and displays 256 bytes from a specified address onto the TV monitor.

Change to Mega Drive mode

This option switches to the Genesis mode.

Change to 32X mode

This option switches to the 32X mode. The mode that's currently in is displayed on the TV monitor.

V interrupt vector address

Click on this option by specifying the desired address. The option moves the V-interrupt to the specified address.

Memory configuration

This option allows the user to display and set the memory access privilege and the write-protect state that are currently in effect. For details on these items, see the 'CartDev Integration Guide'.

Install 32X
Cannot write to the lower 2Mb of sram(not from ?)
Cannot write to the upper 2Mb of sram(from rom)
CartState write protect use of sram from rom 16
CartScene prevent of read/write test from rom 256
Use memory as normal sram area in the ???
CartRAM read/write area prevent from rom 256
Automatically change device to original ram 0x
Set write-protect state

Done
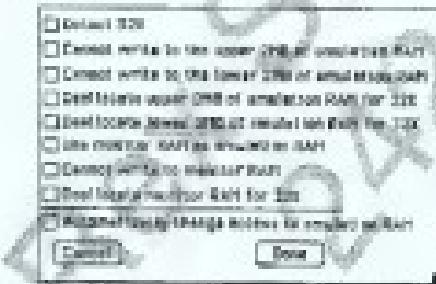
Change font size

This option changes the size of Edit window characters to suit the monitor size and resolution.

Helpful Hints and Technical Information

- The Sound editor is not supported.

- Depending on the particular menu that is selected, the Sound Simulator prompts for an address specification. In the present tool, all addresses must be specified as ROM cartridge real addresses even when they are displayed in the 32X mode.

- In the CartDev, the following comprises the bulk of user-accessible sound emulation RAM; the RAM from 0x000000 through 0x40000, and that-part RAM. Any dual-port RAM addresses can be set by the user. The initial values are 0x20300 for the Genesis mode, and 0x8E0000 for the 32X mode. See the "Main Cartridge Development System Board Description" for an explanation of how to set these addresses.

- When using the Switch control over to 68000 and run program (user function), take the following information into consideration.

When the Sound Simulator is running, only V-interrupts occur on the Mega Drive 68000. When these interrupts occur, the system register contains the data 0x2500

- The Mega Drive workspace RAM that is available to users is 0x1000 bytes from 0x00000 through 0xFF0FFF

- The Sound Simulator contains a high-level ... Sound area. Check the file for the addresses of Sound Driver. These programs can be replaced. To replace a Sound Driver, name the file for the new sound driver as either "MD_DRV.BIN" (is binary file) or "MD_DRV.S28" (a Motorola S-format file) and store the new name in the folder in which the 32x buffers is located. When the file is not found, the Sound Simulator automatically loads the built-in Sound Driver. Any of the several sound drivers that are supplied can be loaded in this manner. Similarly, the 32X control program should be named as either "ROMTOP.BIN" or "ROMTOP.S28". Note that if the ROMTOP program is present, SRAM will be unable to support it

- The 68000 code space from 0x600000 through 0x6FFFFF is system-reserved for future use. Nothing should be loaded in this area.

Error Listings

SCSI inquiry. CartDev is not connected.

Application will terminate

The environment will be saved and the application will terminate.

Not enough memory to open the Map Window

Insufficient memory. Please re-execute the application and try again.

Too many steps (50 steps maximum).

Too many blocks (32 blocks maximum)

The file is already being used

An invalid file exists. The volume is not mounted

An error occurred while loading.

Macintosh resource files cannot be transmitted by themselves.

Not enough memory to load the program.

Cannot read file

Cannot write file.

Also reminium wait due to memory shortage. The block cannot be read automatically.

CartDev is not responding. Check all connections.

The specified function is not supported.

The file transfer failed due to a possible application error.

Cannot send to Dual-Port RAM

Dual-Port RAM access was not restored within one second

More than 8000 bytes were moved.

The job will be terminated.

Unknown file format.

The uncompressed data is larger than the data size that can be handled. Data not converted.

WritePtr and ReadPtr are reversed.

Bad check sum. Cannot convert file.

An error occurred while data was being received, due to a possible application error.

The file cannot be opened from the file menu.

The specified address conflicts with the sound driver. Choose a different address.

The 32X cannot access the selected address. Choose a different address.

The function cannot be used for the System Block.

This data type uses data number 1 when a parent table is received. Therefore, the sound driver ignores the slave file.

Incorrect compression. Unable to start the map.

Unknown format for the "Receive control" program.

Cannot allocate the sound driver in the area used for rank switching.

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